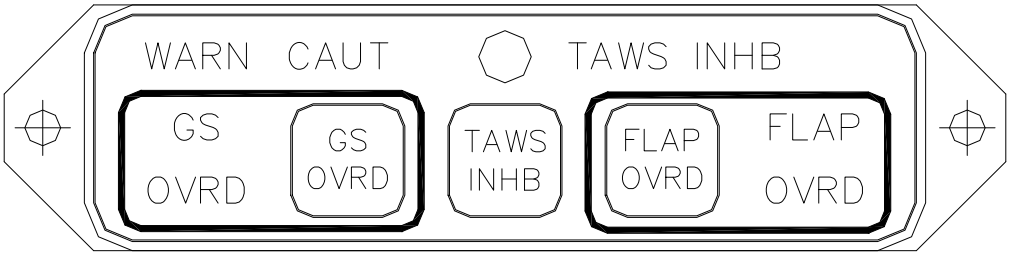
INSTALLATION MANUAL AND OPERATING INSTRUCTIONS

MD41-1200 SERIES TERRAIN AWARENESS ANNUNCIATION CONTROL UNIT for SANDEL ST3400 TAWS

MD41-1248	28vdc	Horizontal Mount
MD41-1258	28vdc	Vertical Mount (shown on page 11)
MD41-1244	14vdc	Horizontal Mount
MD41-1254	14vdc	Vertical Mount (shown on page 11)



Mid-Continent Instruments and Avionics
9400 E. 34th Street N., Wichita, KS 67226 USA
Phone 316-630-0101 • Fax 316-630-0723

Manual Number 9015733
REV. 1 July 21, 2004

Revision Detail

Rev.	Date	Detail
N/R	04/19/04	Complete issue
1	07-21-04	TAWS INHB was Green, now Amber

TABLE OF CONTENTS

SECTION 1	**GENERAL DESCRIPTION**
1.1	INTRODUCTION
1.2	SPECIFICATIONS, TECHNICAL
1.2.1	PHYSICAL CHARACTERISTICS
1.2.2	ENVIRONMENTAL CHARACTERISTICS
1.2.3	SPECIFICATIONS, ELECTRICAL
1.2.4	FRONT PANEL CONTROLS AND ANNUNCIATIONS
1.2.4.1	CONTROLS
1.2.4.2	ANNUNCIATIONS
SECTION 2	**INSTALLATION CONSIDERATIONS**
2.1	COOLING
2.2	EQUIPMENT LOCATION
2.3	ROUTING OF CABLES
SECTION 3	**INSTALLATION PROCEDURE**
3.1	GENERAL INFORMATION
3.2	UNPACKING AND INSPECTING
3.3	MOUNTING THE MD41-( )
3.4	INSTALLATION LIMITATIONS
SECTION 4	**POST INSTALLATION CHECKOUT**
4.1	PRE-INSTALLATION TEST
4.2	OPERATING INSTRUCTIONS
SECTION 5	**INSTRUCTIONS FOR CONTINUED AIRWORTHINESS**
5.1	INTRODUCTION
5.2	CONTROL, OPERATION INFORMATION
5.3	MAINTENANCE INSTRUCTIONS
5.4	TROUBLESHOOTING INFORMATION
5.5	REMOVAL AND REPLACEMENT INFORMATION
5.6	DIAGRAMS
5.7	SPECIAL INSPECTION REQUIRMENTS
5.8	SPECIAL TOOLS
5.9	OVERHAUL PERIOD

Table of Contents (cont)

FIGURE NO:	LIST OF ILLUSTRATIONS
3.1	SCHEMATIC PINOUT, 25 PIN DSUB
3.2	OUTLINE DRAWING
3.3	WIRING DIAGRAM, MD41-1244, -1254
3.4	WIRING DIAGRAM, MD41-1248, -1258, -1248(5V), -1258(5V)
3.5	SCHEMATIC DIAGRAM, MD41-1248, -1258, -1248(5V), -1258(5V)

APPENDIX

ENVIRONMENTAL QUALIFICATION FORM

SECTION 1: GENERAL DESCRIPTION

1.1 INTRODUCTION

The MD41-1244, -1254, -1248, -1258 is a compact, self -contained Annunciation and Control unit. The fully integrated, control unit provides annunciation and mode selection for the Sandel ST3400 TAWS (Terrain Awareness Warning System).

Other features include dual 20,000 hour lamps used for all annunciations, internally lighted selection switches and choice of manual or automatic photocell dimming. A external annunciation dimming adjustment is provided for balancing low level light conditions.

1.2 SPECIFICATIONS, TECHNICAL

1.2.1 PHYSICAL CHARACTERISTICS

Mounting:	Panel
Width:	2.75 Inches
Height:	0.80 Inches
Depth:	3.22 Inches
Weight:	0.50 lbs.

1.2.2 ENVIRONMENTAL CHARACTERISTICS

TSO compliance:	C151a
Applicable Documents:	RTCA DO-160D
Operating Temperature Range:	-55°C to +70°C
Humidity:	95% Non-Condensing
Altitude Range:	0 to 55,000 ft.
Operational Shock:	Rigid Mounting, 6 G Operational 20 G Crash Safety

1.2.3 SPECIFICATIONS, ELECTRICAL

Design	All Solid State
MD41-1244, -1254	0.30 Amps
MD41-1248, -1258	0.40 Amps
MD41-1248(5V), -1258(5V)	0.42 Amps

1.2.4 FRONT PANEL CONTROLS AND ANNUNCIATIONS

1.2.4.1 CONTROLS

GS OVRD	Momentary pushbutton. Allows disabling of glideslope alerting.
TAWS INHB	Momentary pushbutton. In the INHB state, the the TAWS alerts, PRED and REL displays are disable but the GPWS alerts and TOPO display remain active.
FLAP OVRD	Momentary pushbutton. In the override state, this will disable the flap warning at 200’ when making a no flap landing.

1.2.4.2 ANNUNCIATIONS

WARN (red)	An alert for a detected terrain threat that requires immediate crew action.
CAUT (amber)	An alert requiring immediate crew awareness. Subsequent corrective action will normally be necessary.
TAWS/ INHB (amber)	All FLTA and PDA alerts are completely suppressed. GPWS alerts are still active. PRED and REL displays are disabled except during ground operations.
GS OVRD (amber)	Glideslope override is active, no glideslope alerts will occur.
FLAP/ OVRD (amber)	Flap override active. The system treats the flaps as if they are in the landing configuration (down) regardless of their true position.

1.2.5 EQUIPMENT LIMITATIONS

The MD41-1200 series control units contain specific dash numbers to be used with various Terrain Awareness Warning Systems. The installer must match the correct controller part number with the system that is being installed.

The MD41-1248, -1248(5V), -1258, -1258(5V), -1244, -1254 is TSO'D and certified for use with the Sandel Avionics Terrain Awareness Warning System (TAWS). Any attempts to install the listed units in an installation other than above system is prohibited. **This will void the TSO.**

NOTE: If the MD41-( ) is disconnected or removed from the aircraft, there will be no effect in the operation of the TAWS system.

1.2.7 MAJOR COMPONENTS

This system is comprised of one major component, the MD41-1200 series TAWS Annunciation Control Unit.

SECTION 2: INSTALLATION CONSIDERATIONS

2.1 COOLING

No direct cooling is required. As with any electronic equipment, overall reliability may be increased if the MD41-1244, -1254, -1248, -1258 is not located near any high heat source or crowded next to other equipment. Means of providing a gentle air flow will be a plus.

2.2 EQUIPMENT LOCATION

The MD41-124X series ACU must be mounted as close to the pilot's field of view as possible. Please reference the Sandel ST3400 installation manual for approved locations. The unit depth, with connector attached, must also be taken into consideration.

2.3 ROUTING OF CABLES

Care must be taken not to bundle the MD41-1244, -1254, -1248, -1258 logic and low level signal lines with any high energy sources. Examples of these sources include 400 HZ AC, Comm, DME, HF and transponder transmitter coax. Always use shielded wire when shown on the installation print.
Avoid sharp bends in cabling and routing near aircraft control cables.

SECTION 3: INSTALLATION PROCEDURES

3.1 GENERAL INFORMATION

This section contains interconnect diagrams, mounting dimensions and other information pertaining to the installation of the MD41-1244, -1254, -1248, -1258. After installation of cabling and before installation of the equipment, ensure that power is applied only to the pins specified in the interconnect diagram.

3.2 UNPACKING AND INSPECTING EQUIPMENT

When unpacking equipment, make a visual inspection for evidence of damage incurred during shipment. The following parts should be included:

1. MD41-1244 (14V) or MD41-1248 (28V) Horiz. Mount
   MD41-1244 (14V) or MD41-1258 (28V) Vert. Mount
   MD41-1248(5V), (28volt) 5 volt button lighting Horiz. Mount
   MD41-1258(5V), (28volt) 5 volt button lighting Vert. Mount
2. J1 Connector Kit (25 pin). MCI P/N 7014517
3. Installation Manual. MCI P/N 9015733

3.3 MOUNTING THE MD41-( )

Avoid mounting close to heater vents or other high heat sources. Allow a clearance of at least 3 inches from back of unit for plug removal.

The indicator is secured in place behind the panel since it is designed for rear mount only. Make a panel cutout as shown in Figure 3-2. Secure the indicator in place with two 4-40 x 3/8 flat head phillips screws.

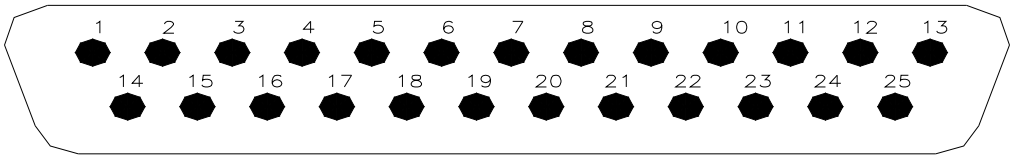
3.4 INSTALLATION LIMITATIONS

Wire the aircraft harness according to figure 3-3 or 3-4. Use at least 24 AWG wire for all connections. Avoid sharp bends and routing cable near high-energy sources. Care must be taken to tie the harness away from aircraft controls and cables. Also see equipment limitations, section 1.2.5.

“The TSO identifies the minimum performance standards, tests and other conditions applicable for issuance of design and production approval of the article. The TSO does not specifically identify acceptable conditions for installations of the article. The TSO applicant is responsible for documenting all limitations and conditions suitable for installation of the article. An applicant requesting approval for installation of the article within a specific type or class of product is responsible for determining environmental and functional compatibility.”

This Annunciation Control Unit is part of an incomplete system. The intended function is to provide required or optional annunciation and mode selection for Class A or B TAWS systems.

J1 CONNECTOR

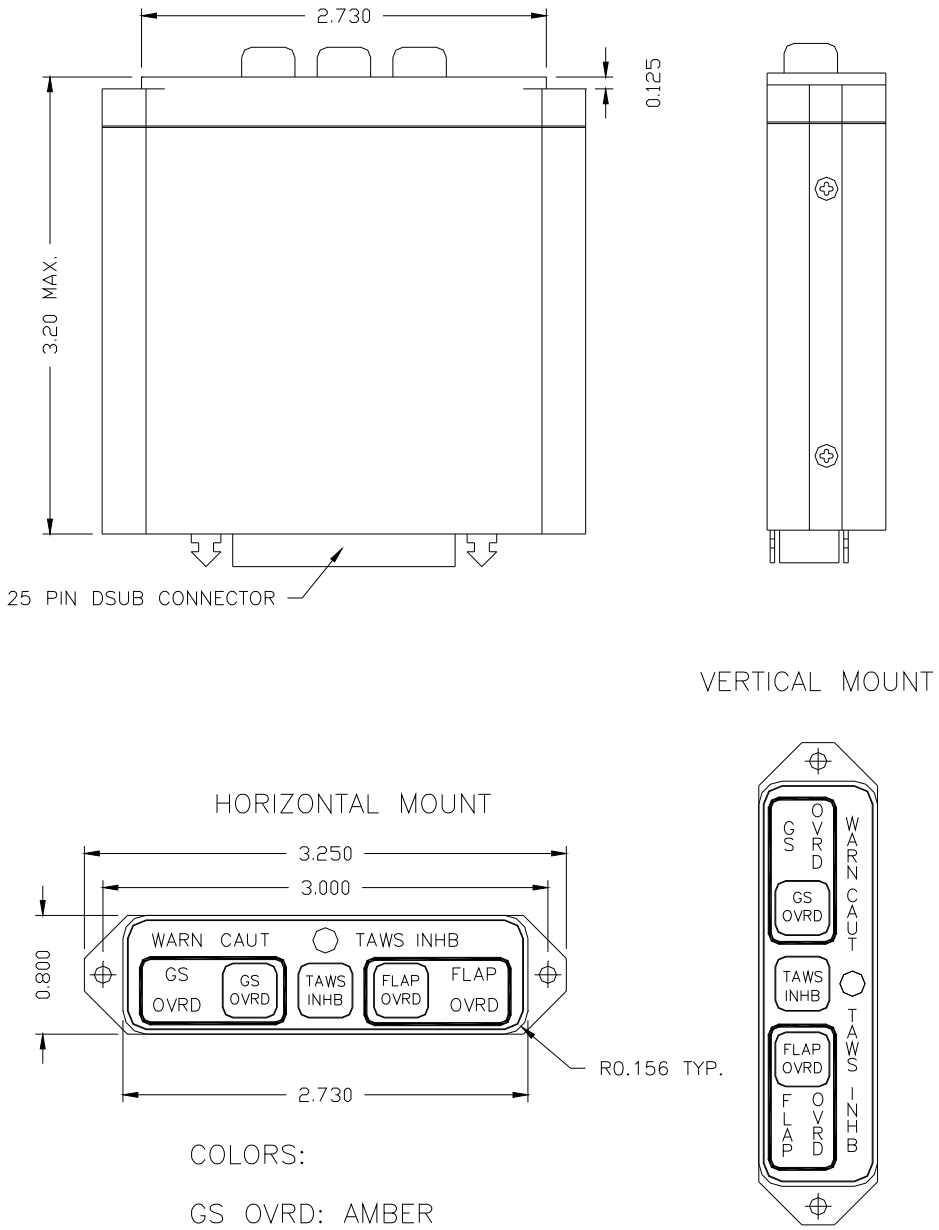


REAR VIEW OF J1 CONNECTOR

J1
PIN NO.

1 ----------	Spare
2 ----------	Spare
3 ----------	Spare
4 ----------	Spare
5 ----------	Terrain Caution annunciate input. Receives logic low to annunciate.
6 ----------	Annunciation lamp test. (receives ground from remote test switch, optional connection)
7 ----------	Bright/Dim annunciation lamp power..
8 ----------	Push button lighting. To lighting buss.
9 ----------	Ground for push-button lighting.
10 ----------	TAWS Inhibit annunciate input. Receives logic low to annunciate.
11 ----------	Warning annunciate input. Receives logic low to annunciate.
12 ----------	Internal photocell dimming output. To use, jumper pins 12 to pin 7.
13 ----------	Unit power.
14 ----------	GS OVRD annunciate input. Receives logic low to annunciate.
15 ----------	FLAP OVRD annunciate input. Receives logic low to annunciate.
16 ----------	Spare
17 ----------	Spare
18 ----------	TAWS Inhibit select output. Sends momentary ground to ST3400 when pressed.
19 ----------	FLAP OVRD select output. Sends momentary ground to ST3400 when pressed.
20 ----------	GS OVRD select output. Sends momentary ground to ST3400 when pressed.
21 ----------	Power ground.
22 ----------	Spare
23 ----------	Spare
24 ----------	Spare
25 ----------	Spare

FIGURE 3-1 SCHEMATIC PINOUT, 25 PIN DSUB

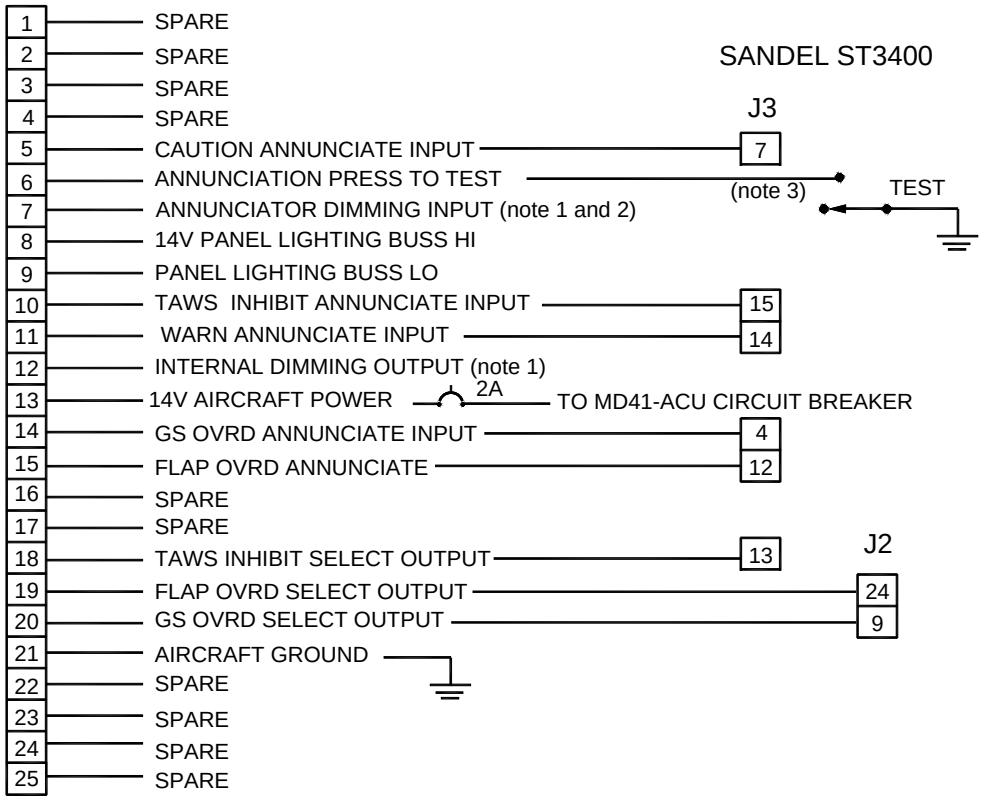


Note 1: Use two 4-40 X 3/8" Flat Head Phillips Screws for Mounting

FIGURE 3-2 OUTLINE DRAWING

MD41-1244, -1254
ANNUNCIATION-CONTROL

J1 14 VOLT



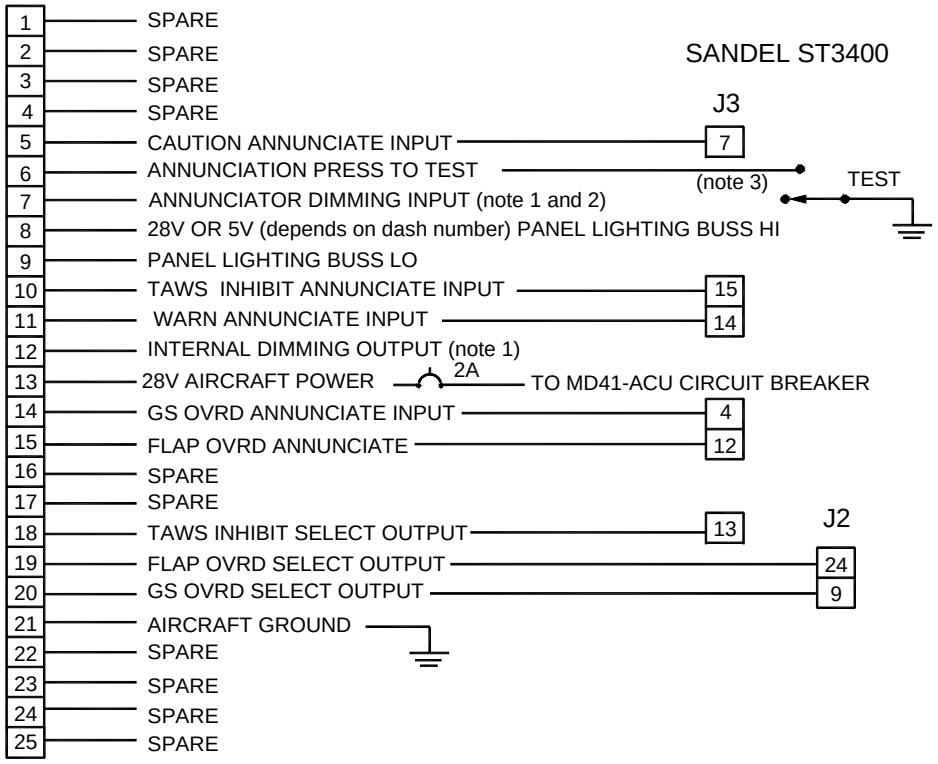
NOTES:

1) JUMPER 7 TO 12 FOR ANNUNCIATION BRIGHTNESS TO BE CONTROLLED BY INTERNAL PHOTOCELL OR PIN 7 MAY BE CONNECTED TO AIRCRAFT BRT/DIM SWITCH
2) ANNUNCIATOR POWER MUST BE SELECTED SO THAT ANNUNCIATORS ARE VISIBLE UNDER ALL LIGHTING CONDITIONS.
3) MOMENTARY SWITCH FOR LAMP TEST. (optional connection)
4) REFER TO SANDEL ST3400 INSTALLATION MANUAL FOR ACTUAL INSTALLATION.

FIGURE 3-3 WIRING DIAGRAM, MD41-1244, -1254

MD41-1248, -1258, -1248(5V), -1258(5V)
ANNUNCIATION-CONTROL

J1 28 VOLT



NOTES:

1) JUMPER 7 TO 12 FOR ANNUNCIATION BRIGHTNESS TO BE CONTROLLED BY INTERNAL PHOTOCELL OR PIN 7 MAY BE CONNECTED TO AIRCRAFT BRT/DIM SWITCH
2) ANNUNCIATOR POWER MUST BE SELECTED SO THAT ANNUNCIATORS ARE VISIBLE UNDER ALL LIGHTING CONDITIONS.
3) MOMENTARY SWITCH FOR LAMP TEST. (optional connection)
4) REFER TO SANDEL ST3400 INSTALLATION MANUAL FOR ACTUAL INSTALLATION.

FIGURE 3-4 WIRING DIAGRAM, MD41-1248, -1258 -1248(5V), -1258(5V)

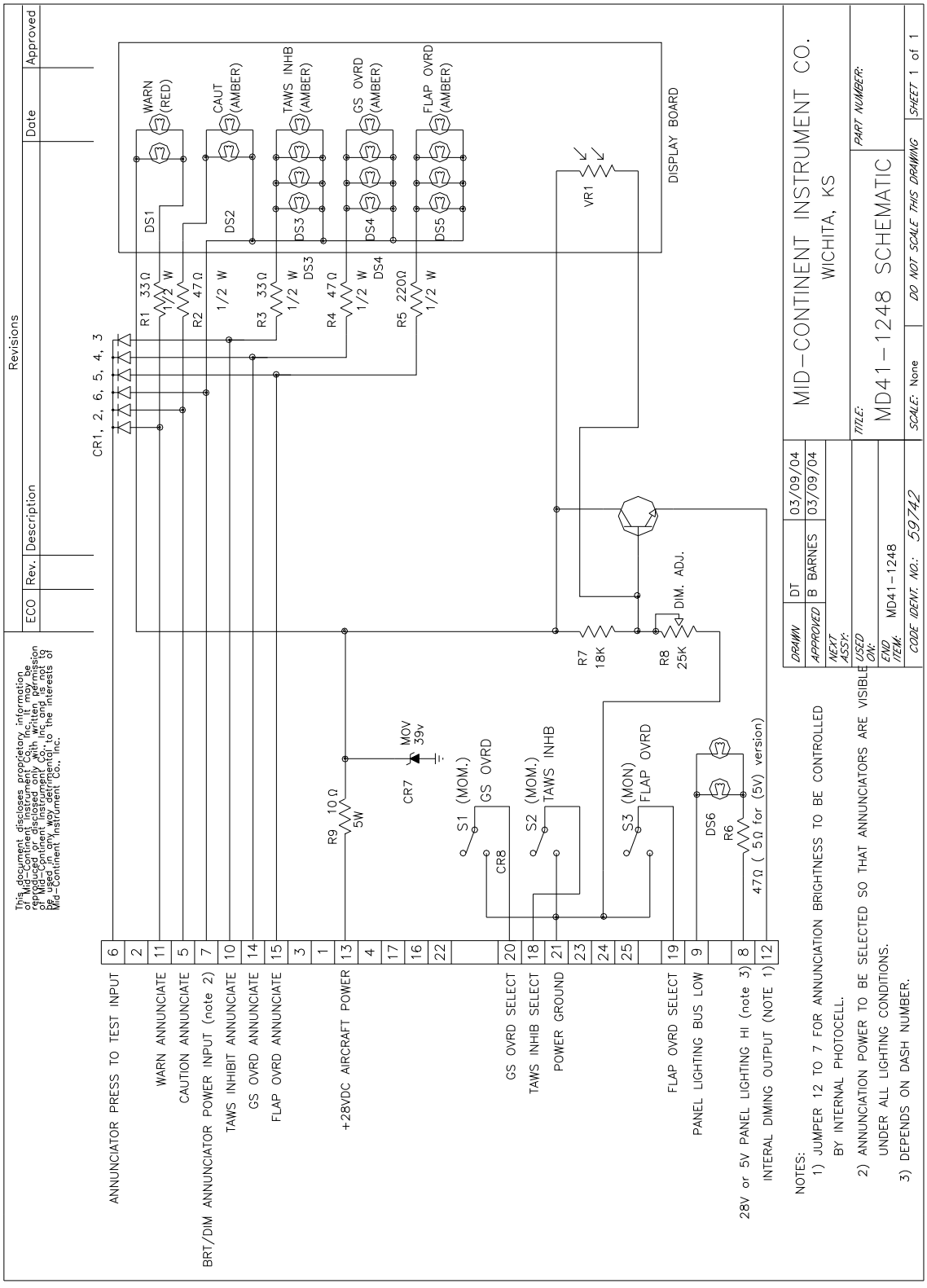


FIGURE 3-5 SCHEMATIC, MD41-1248, -1258, -1248(5V), -1258(5V)

SECTION 4: POST INSTALLATION CHECKOUT

4.1 PRE INSTALLATION TESTS

With the MD41-( ) disconnected, turn on the avionics master switch and verify that aircraft power is on pin 13 for. Using an ohm-meter, verify pin 21 is aircraft ground.

4.2 OPERATING INSTRUCTIONS

Refer to the Sandel ST3400 pilots guide or installation manual for final testing of the MD41-( ).

SECTION 5: INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

5.1 INTRODUCTION

This document identifies the instructions for Continued Airworthiness for the MD1200 series TAWS Annunciation Control Unit.

5.2 CONTROL, OPERATION INFORMATION

Refer to the Sandel Avionics Pilots Guide and section 1.2.4 of this manual.

5.3 MAINTENANCE INSTRUCTIONS

Repair of the MD41-1200 ACU is “on condition only”, periodic maintenance is not required.

Calibration and inspection intervals are not required. Service life will be a minimum of 20,000 hours.

5.4 TROUBLESHOOTING INFORMATION

Refer to the MD41-1200 series Maintenance Manual.

5.5 REMOVAL AND REPLACEMENT INFORMATION

If the unit is removed and reinstalled, a functional check of the equipment should be conducted in accordance with the Sandel Avionics ST3400 preflight test procedure.

5.6 DIAGRAMS

Refer to figure 3-2, 3-3 and 3-4 of this manual.

5.7 SPECIAL INSPECTION REQUIRMENTS: N/A

5.8 SPECIAL TOOLS: None

5.9 OVERHAUL PERIOD: No overhaul time limitations

ENVIRONMENTAL QUALIFICATION FORM

RTCA / DO160D

NOMENCLATURE: MD41-( ) TERRAIN AWARENESS ANNUNCIATION CONTROL UNIT

MODEL NO: MD41-( ) TSO C151a

MANUFACTURER: Mid-Continent Instruments and Avionics
9400 E. 34th Street N.
Wichita, KS 67226
Phone (316) 630-0101

Conditions	Section	Description of Conducted Tests
Temperature and Altitude	4.0	Equipment tested to Category A1 and F2
Low Temperature	4.5.1	
High Temperature	4.5.2 & 4.5.3	
In-Flight Loss of Cooling	4.5.4	Cooling air not required
Altitude	4.6.1	
Decompression	4.6.2	
Overpressure	4.6.3	Not Tested
Temperature Variation	5.0	Equipment tested to Category C
Humidity	6.0	Equipment tested to Category A
Shock	7.0	Equipment tested to Category B
Operational	7.2	
Crash Safety	7.3	
Vibration	8.0	Aircraft type 1 (helicopter) tested to category U Aircraft type 2 through 6 tested to category S
Explosion	9.0	Equipment identified as Category X, no test required
Waterproofness	10.0	Equipment identified as Category X , no test required

Environmental Qualification (cont.)

Conditions	Section	Description of Conducted Tests
Fluids Susceptibility	11.0	Equipment identified as Category X, no test required
Sand and Dust	12.0	Equipment identified as Category X, no test required
Fungus	13.0	Equipment identified as Category X, no test required
Salt Spray	14.0	Equipment identified as Category X, no test required
Magnetic Effect	15.0	Equipment tested to Class Z
Power Input	16.0	Equipment tested to Category B
Voltage Spike	17.0	Equipment tested to Category A
Audio Frequency Susceptibility	18.0	Equipment tested to Category B
Induced Signal Susceptibility	19.0	Equipment tested to Category A
Radio Frequency Susceptibility	20.0	Equipment tested to Category T
Radio Frequency Emissions	21.0	Equipment tested to Category B and M
Lightning Induced Transient Susceptibility	22.0	Equipment tested to Category A3C3
Lightning Direct Effects	23.0	Equipment identified as Category X, no tests required
Icing	24.0	Equipment identified as Category X, no test required